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SINCE 1975

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INSTRUCTIONS

MODEL AVR-E4-C-P-OSH-MJLB PULSE GENERATOR

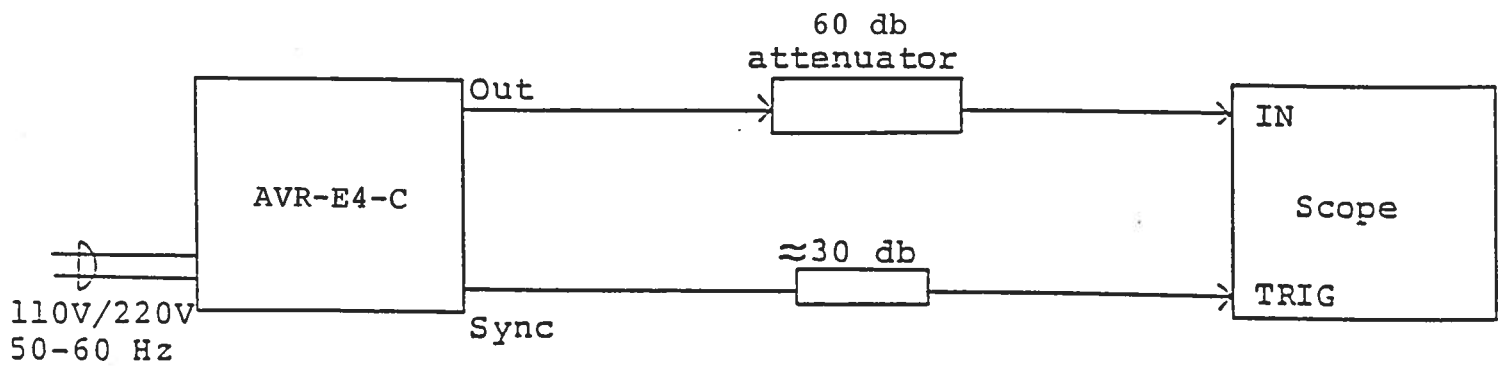
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WARRANTY

Avtech Electrosystems Ltd. warrants products of its manufacture to be free from defects in material and workmanship under conditions of normal use. If, within one year after delivery to the original owner, and after prepaid return by the original owner, this Avtech product is found to be defective, Avtech shall at its option repair or replace said defective item. This warranty does not apply to units which have been disassembled, modified or subjected to conditions exceeding the applicable specifications or ratings. This warranty is the extent of the obligation or liability assumed by Avtech with respect to this product and no other warranty or guarantee is either expressed or implied.

Fig. 1

PULSE GENERATOR TEST ARRANGEMENT



Notes:

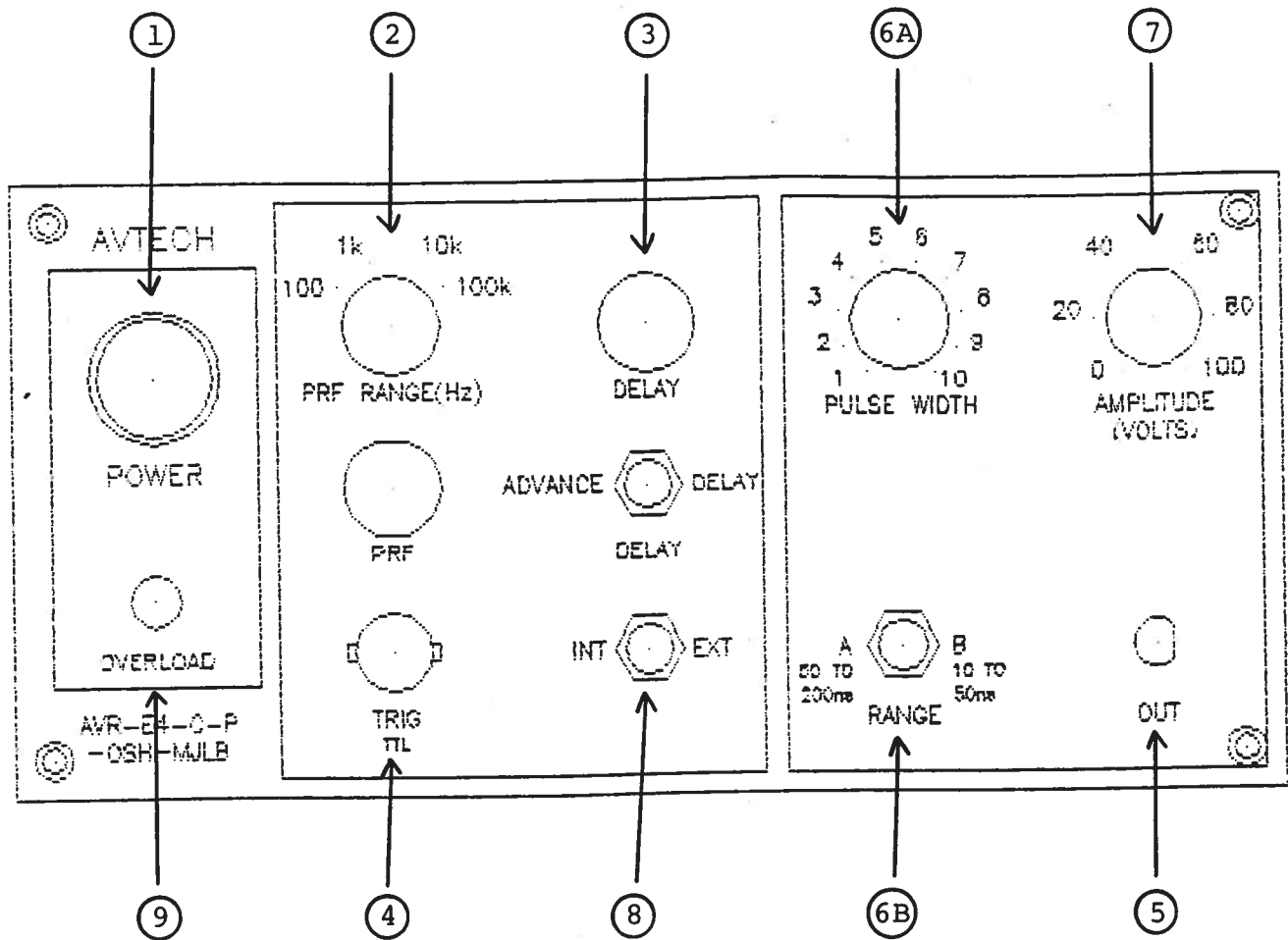
- 1) The bandwidth capability of components and instruments used to display the pulse generator output signal (attenuators, cables, connectors, etc.) should exceed 2 GHz.
 - 2) The use of 60 db attenuator at the scope vertical input channel will insure a peak input signal to the scope of less than one volt (necessary only if sampling scope used). If a high impedance real time scope is used, the pulse generator should be terminated using a shunt 50 ohm resistor.
 - 3) The TRIG output channel provides TTL level signals. To avoid overdriving the TRIG input channel of some scopes, a 30 db attenuator should be placed at the input to the scope trigger channel. The TRIG output precedes the main output when the front panel ADVANCE-DELAY switch is in the ADVANCE position. The TRIG output lags the main output when the switch is in the DELAY position.
 - 4) To obtain a stable output display the PW and PRF controls on the front panel should be set mid range. The front panel TRIG toggle switch should be in the INT position. The DELAY controls and the scope triggering controls are then adjusted to obtain a stable output. The scope may then be used to set the desired PRF by rotating the PRF controls.
 - 5) The output pulse width is controlled by means of the front panel one turn PW control and the position range switch as follows:
 - A) 50 to 200 ns
 - B) 10 to 50 ns
- CAUTION: DO NOT EXCEED THE DUTY CYCLE RATING OF 0.5%.**
- 6) The output pulse amplitude is controlled by means of the front panel one turn AMP control.
 - 7) An external clock may be used to control the output PRF of the AVR unit by setting the front panel TRIG toggle switch in the EXT position and applying a 0.2 us (approx.) TTL level pulse to the TRIG BNC connector input. For operation in this mode, the scope time base must also be triggered by the external clock.
 - 8) The output pulse may be offset by 0 to ± 100 VDC by applying the desired offset rating to the rear panel OS solder terminal. Note that the DC offset current must not exceed 100 mA so normally a DC blocking capacitor must be placed in series with the 50 Ohm load (the pulse generator pulse output requires a 50 Ohm load).

9) AVR units with a serial number higher than 5600 are protected by an automatic overload protective circuit which controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a short circuit), the protective circuit will turn the output of the instrument OFF and turn the indicator light ON. The light will stay ON (i.e. output OFF) for about 5 seconds after which the instrument will attempt to turn ON (i.e. light OFF) for about 1 second. If the overload condition persists, the instrument will turn OFF again (i.e. light ON) for another 5 seconds. If the overload condition has been removed, the instrument will turn on and resume normal operation. Overload conditions may be removed by:

- 1) Reducing PRF (i.e. switch to a lower range)
- 2) Reducing pulse width (i.e. switch to a lower range)

Fig. 2

FRONT PANEL CONTROLS



- (1) ON-OFF Switch. Applies basic prime power to all stages.
- (2) PRF Control. Varies PRF as follows:

	MIN	MAX
Range 1	10 Hz	100 Hz
Range 2	100 Hz	1000 Hz
Range 3	1000 Hz	10 kHz
Range 4	10 kHz	100 kHz

The operating PRF should be set using a scope.

- (3) DELAY Control. Controls the relative delay between the reference output pulse provided at the TRIG output (4) the main output (5). This delay is variable over the range of 0 to about 1.0 us. The TRIG output precedes the main output when the ADVANCE-DELAY switch is in the ADVANCE position and lags when the switch is in the DELAY position.
- (4) TRIG Output. This output is used to trigger the scope time base. The output is a TTL level 100 ns (approx.) pulse capable of driving a fifty ohm load.
- (5) OUT Connector. SMA connector provides output to a fifty ohm load.
- (6) PW Control. A one turn control and two-position range switch which varies the output pulse width as follows:
 - A) 50 to 200 ns
 - B) 10 to 50 ns

CAUTION: DO NOT EXCEED THE DUTY CYCLE RATING OF 0.5%, for example:

PRF = 100 kHz, $PW_{MAX} = 50$ ns
 PRF = 25 kHz, $PW_{MAX} = 200$ ns

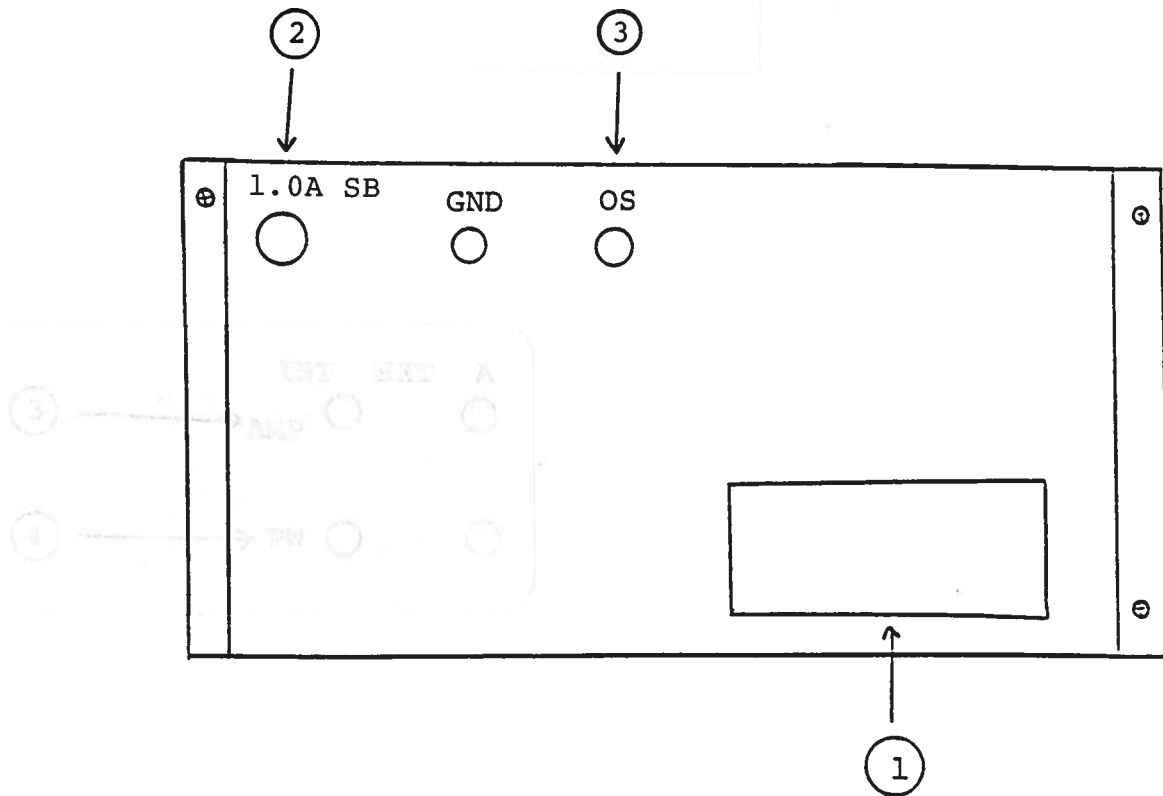
- (7) AMP Control. A one turn control which varies the output pulse amplitude to a fifty ohm load.
- (8) EXT-INT Control. With this toggle switch in the INT position, the PRF of the AVR unit is controlled via an internal clock which in turn is controlled by the PRF controls. With the toggle switch in the EXT position, the AVR unit requires a 0.2 us TTL level pulse applied at the TRIG input in order to trigger the output stages. In addition, in this mode, the scope time base must be triggered by the external trigger source.

(9) AVR units with a serial number higher than 5600 are protected by an automatic overload protective circuit which controls the front panel overload light. If the unit is overloaded (by operating at an exceedingly high duty cycle or by operating into a short circuit), the protective circuit will turn the output of the instrument OFF and turn the indicator light ON. The light will stay ON (i.e. output OFF) for about 5 seconds after which the instrument will attempt to turn ON (i.e. light OFF) for about 1 second. If the overload condition persists, the instrument will turn OFF again (i.e. light ON) for another 5 seconds. If the overload condition has been removed, the instrument will turn on and resume normal operation. Overload conditions may be removed by:

- 1) Reducing PRF (i.e. switch to a lower range)
- 2) Reducing pulse width (i.e. switch to a lower range)

Fig. 3

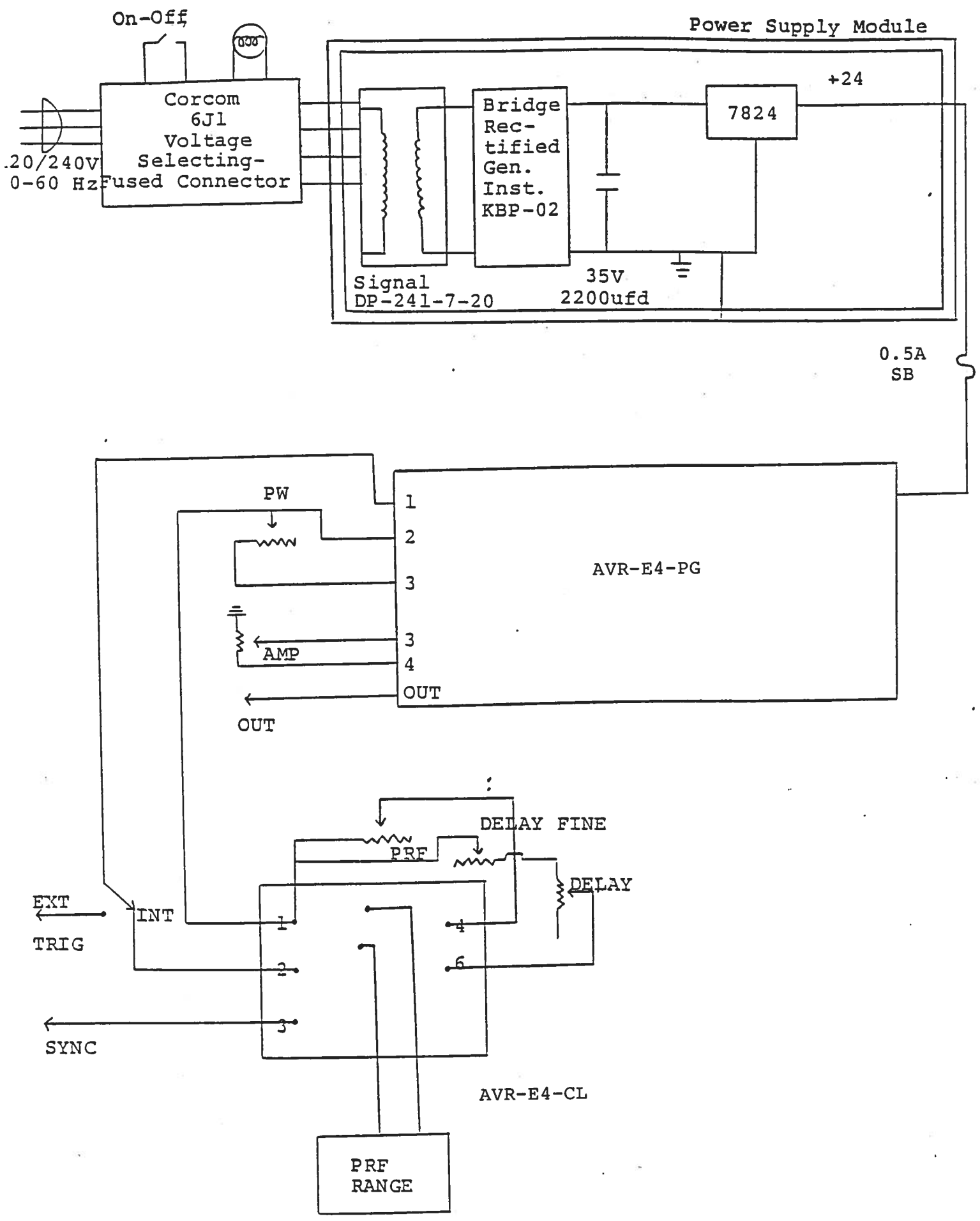
BACK PANEL CONTROLS



- (1) FUSED CONNECTOR, VOLTAGE SELECTOR. The detachable power cord is connected at this point. In addition, the removable cord is adjusted to select the desired input operating voltage. The unit also contains the main power fuse (0.25A SB).
- (2) 1.0A SB. Fuse which protects the output stage if the output duty cycle rating is exceeded.
- (3) DC OFFSET Input. To DC offset the output pulse, connect a DC power supply set to the desired offset value to these terminals. The maximum allowable DC offset voltage is +100 volts (+100 mA).

Fig. 4

SYSTEM BLOCK DIAGRAM



SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVR-E4-C consists of the following basic modules:

- 1) AVR-E4-PG pulse generator module
- 2) AVR-E4-CL clock module
- 3) +24V power supply board

The modules are interconnected as shown in Fig. 4. The clock module controls the output PRF and the relative delay between the main output and the SYNC outputs. The PW pulse generator modules generate the output pulse. In the event of an instrument malfunction, it is most likely that the rear panel 0.5A SB fuse may have failed due to an output short circuit condition or to a high duty cycle condition.

- a) 0.1 usec TTL level outputs are observed at pins 2 and 3.
- b) The PRF of the outputs can be varied over the range of 0.1 KHz to 100 KHz using the PRF & PRF FINE and PRF RANGE controls.
- c) The relative delay between the pin 2 and 3 outputs can be varied by at least 500 nsec by the DELAY controls.

The sealed clock module must be returned to Avtech for repair or replacement if the above conditions are not observed. The power supply board generates +24V DC to power the other modules. If the voltage is less than +24V, turn off the prime power and unsolder the lead from the 7824 regulator chip on the power supply board. Solder a 100 ohm 5 watt resistor to the 7824 output to ground and turn on the prime power. A voltage of +24 volts should be read. If the voltage is less then the power supply board is defective and should be repaired or replaced.

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SYSTEM DESCRIPTION AND REPAIR PROCEDURE

The AVR EA-5 consists of the following basic modules:

- 1) AVR-EA-PC pulse generator module
- 2) AVR-EA-CL clock module
- 3) +24V power supply board

The modules are interconnected as shown in Fig. 4. The clock module controls the output PWF and the relative delay between the main output and the SYNC outputs. The PW pulse generator module generates the output pulse. In the event of an instrument malfunction, it is most likely that the rear panel 0.5A SB fuse may have failed due to an output short circuit condition or to a high duty cycle condition.

- a) 0.1 usec TTL level outputs are observed at pins 2 and 3.
- b) The PWF of the outputs can be varied over the range of 0.1 KHz to 100 KHz using the PRR & PRR FINE and PRR RANGE controls.
- c) The relative delay between the pin 2 and 3 outputs can be varied by at least 500 nsec by the DELAY controls.

The sealed clock module must be returned to Avtech for repair or replacement if the above conditions are not observed. The power supply board generates +24V DC to power the other modules. If the voltage is less than +24V, turn off the prime power and unseal the lead from the 7824 regulator clip on the power supply board. Solder a 100 ohm 5 watt resistor to the 7824 output to ground and turn on the prime power. A voltage of +24 volts should be read. If the voltage is less than the power supply board is defective and should be repaired or replaced.